Backtesting Trading Strategies Training Course

Professional Development Training Course Outline

Category	Capital Markets and Investment	**Duration**	10 Days
Base Fee	$3,000 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Backtesting Trading Strategies Training Course is a comprehensive, data-driven program designed to equip finance professionals, quantitative analysts, portfolio managers, and algorithmic traders with advanced competencies in quantitative finance, algorithmic trading, systematic investing, and risk-adjusted performance optimization. In today's volatile financial markets characterized by high-frequency trading, machine learning integration, big data analytics, and automated execution systems, the ability to design, test, validate, and optimize trading strategies using historical market data has become a critical competitive advantage. This course integrates financial econometrics, Python programming for trading, statistical modeling, Monte Carlo simulation, and portfolio optimization frameworks to enhance predictive accuracy, reduce overfitting bias, and improve Sharpe ratio performance.

Participants will explore robust backtesting frameworks, data preprocessing techniques, walk-forward analysis, event-driven backtesting engines, transaction cost modeling, and performance attribution analysis. Emphasis is placed on eliminating look-ahead bias, survivorship bias, curve fitting, and data snooping errors to ensure institutional-grade validation standards. Through real-world trading case studies covering equities, forex, commodities, derivatives, and crypto assets, learners will develop scalable, automated trading systems aligned with regulatory compliance, capital preservation strategies, and enterprise risk management frameworks.

Programme Curriculum

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Course Objectives

1. Develop robust quantitative trading strategies using Python and R.
2. Apply statistical modeling and financial econometrics in strategy validation.
3. Implement event-driven backtesting engines for multi-asset portfolios.
4. Evaluate risk-adjusted performance using Sharpe ratio, Sortino ratio, and alpha metrics.
5. Eliminate look-ahead bias, survivorship bias, and overfitting errors.
6. Design walk-forward optimization and Monte Carlo simulation models.
7. Integrate machine learning algorithms into trading strategies.
8. Optimize portfolio allocation using modern portfolio theory.
9. Model transaction costs, slippage, and liquidity risk.
10. Apply high-frequency data analytics in backtesting environments.
11. Conduct stress testing and scenario analysis.
12. Develop automated reporting dashboards for trading analytics.
13. Align trading systems with regulatory and compliance standards.

Organizational Benefits

- Improved algorithmic trading performance and alpha generation
- Enhanced risk management and capital preservation
- Reduced model risk and operational risk exposure
- Institutional-grade strategy validation frameworks
- Increased trading automation and execution efficiency

- Data-driven investment decision making
- Strengthened compliance and governance oversight
- Improved portfolio diversification strategies
- Competitive advantage through quantitative innovation
- Enhanced performance monitoring and reporting accuracy

Target Audiences

- Quantitative Analysts
- Portfolio Managers
- Algorithmic Traders
- Risk Management Professionals
- Investment Bank Analysts
- Hedge Fund Professionals
- Financial Data Scientists
- Compliance and Audit Officers

Course Duration: 10 days

Course Modules

Module 1: Foundations of Quantitative Trading

- Overview of systematic trading and algorithmic strategies
- Market microstructure and price behavior analysis
- Financial time series fundamentals
- Data sourcing and cleaning techniques
- Introduction to Python for quantitative finance
- Case Study: Building a simple moving average crossover strategy

Module 2: Financial Data Engineering

- Structured and unstructured market data processing
- Data normalization and transformation
- Handling missing data and outliers
- Feature engineering for predictive modeling
- Data storage architectures for trading systems

- Case Study: Cleaning and preparing equity data for backtesting

Module 3: Statistical Methods for Backtesting

- Hypothesis testing in trading models
- Regression analysis and correlation modeling
- Volatility estimation techniques
- Probability distributions in asset returns
- Stationarity and autocorrelation testing
- Case Study: Statistical validation of a momentum strategy

Module 4: Backtesting Framework Design

- Vectorized vs event-driven backtesting engines
- Strategy parameterization and logic design
- Portfolio rebalancing methodologies
- Performance benchmarking
- Risk metric calculations
- Case Study: Designing a multi-asset backtest engine

Module 5: Bias and Overfitting Control

- Look-ahead bias mitigation
- Survivorship bias elimination
- Data snooping detection
- Cross-validation techniques
- Walk-forward optimization
- Case Study: Identifying overfitting in a mean reversion model

Module 6: Transaction Cost and Liquidity Modeling

- Slippage modeling frameworks
- Bid-ask spread analysis
- Market impact modeling
- Liquidity risk assessment
- Execution cost simulation
- Case Study: Cost-adjusted backtesting of a forex strategy

Module 7: Risk Management Integration

- Value at Risk and Conditional VaR
- Drawdown analysis
- Stress testing frameworks
- Scenario analysis
- Portfolio risk budgeting
- Case Study: Risk-adjusted optimization of equity portfolio

Module 8: Machine Learning in Trading

- Supervised learning algorithms
- Feature selection techniques
- Model training and validation
- Overfitting control in ML models
- Ensemble methods in finance
- Case Study: Random forest model for price prediction

Module 9: Portfolio Optimization Techniques

- Modern portfolio theory
- Efficient frontier construction
- Mean-variance optimization
- Black-Litterman model
- Risk parity strategies
- Case Study: Optimized multi-asset allocation

Module 10: High-Frequency Strategy Testing

- Tick data processing
- Latency and execution speed analysis
- Order book dynamics
- Microstructure noise modeling
- Intraday volatility modeling
- Case Study: Backtesting intraday scalping strategy

Module 11: Performance Analytics and Attribution

- Sharpe, Sortino, and Calmar ratios
- Alpha and beta measurement
- Factor exposure analysis
- Trade-level performance evaluation
- Attribution reporting dashboards
- Case Study: Performance attribution of hedge fund strategy

Module 12: Derivatives and Multi-Asset Backtesting

- Options pricing models
- Futures contract rollovers
- Spread trading strategies
- Volatility trading systems
- Multi-asset correlation modeling
- Case Study: Options delta-hedging backtest

Module 13: Crypto and Alternative Assets

- Crypto market structure
- Arbitrage strategy modeling
- Stablecoin risk evaluation
- On-chain data analytics
- Decentralized exchange backtesting
- Case Study: Crypto momentum strategy validation

Module 14: Automation and Deployment

- API integrations for live trading
- Cloud computing for trading systems
- Strategy monitoring tools
- Continuous integration pipelines
- Automated risk alerts
- Case Study: Deploying a validated strategy to live environment

Module 15: Regulatory and Governance Frameworks

- Financial compliance standards

- Algorithmic trading regulations
- Audit trail documentation
- Model risk governance
- Ethical AI in finance
- Case Study: Regulatory compliance review of automated strategy

Training Methodology

- Instructor-led interactive lectures
- Hands-on Python coding sessions
- Real-time data simulation exercises
- Group strategy design workshops
- Case study analysis and presentations
- Trading system prototype development
- Performance evaluation assignments
- Peer review and feedback sessions

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	04 Dec 2026	Online	$2,000
23 Nov 2026	04 Dec 2026	Physical	$3,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$6,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$9,000
23 Nov 2026	04 Dec 2026	Physical	$12,000
23 Nov 2026	04 Dec 2026	Physical	$12,000

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